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EXAMINER

NGO, TANYA T

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,068	<b>Applicant(s)</b> TAM ET AL.	
	<b>Examiner</b> TANYA NGO	<b>Art Unit</b> 2613	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 04 May 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-17 is/are pending in the application.
- 4a) Of the above claim(s) 2 and 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 5/4/2011 have been fully considered but they are not persuasive.

In the response, the applicant stated that "applicant respectfully traverses the Examiner's rejections and submits that the currently claimed invention is not obvious over the cited reference, on the basis that there is no teaching, suggestion or motivation to combine the cited references" (page 3, ¶ 3). The applicant continues the arguments in stating "the examiner appears to have failed to establish why those skilled in the art would have been motivated to use or replace the discrete sensors 32 with fiber Bragg gratings, when examples such as 'Rayleigh, Brillouin, and Raman scattering techniques' are already explicitly proposed by Tubel for railway applications" (pg 10, ¶2)

However, Tubel does disclose that "distributed fiber sense device 30 and discrete sensors 32 located through the rail system 302 or road system may also be used to monitor other adverse conditions such as subsidence on the ground that can damage the structure. The use of distributed fiber sensing device 30 to detect and measure physical parameters such as pressure, temperature, strain, and acoustics can assure that the structure is being monitored properly" (¶ [0115]), wherein fiber Bragg gratings are disclosed to be well known in the art to be discrete sensors to measure temperature and traverse strain effects, ¶h [0022]. Hence, the use of the discrete sensors, such as fiber Bragg gratings, are also disclosed as another alternative to monitor conditions in Tubel's railway system. It would be obvious for one of ordinary skill in the art to realize that they could use discrete sensors or Rayleigh, Brillouin, and Raman scattering techniques.

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Furthermore, just because Tubel is not aware of the full potential does not mean that one of ordinary skill believes that the discrete sensor or Fiber Bragg grating is not a viable option. One of ordinary does not mean that one of ordinary skill in the art would think that discrete sensor 32, such as fiber Bragg grating, is usable in the railway system because the application does disclose the use of the discrete sensor used in a railway system (§ [0015]). Hence, a discrete sensor, such as a fiber Bragg grating, is a viable option for one of ordinary skill in the art.

Also, applicant believes that Tubel's statement of "the advantage of this latter embodiment over the use of single point or distributed downhole sensors (such as the Bragg grating sensor 32 described in the aforementioned patent is improved reliability, lower cost, as well as more precise measurements" (§ [0099]). However, when an individual reads the patent in its entirety, the application of the sensors being discussed in paragraph [0099] is not the application of the sensor system in a railway system, but is rather a cementing operation in which the "distributed or single point pressure, strain, and/or temperature sensors 32 are deployed in the well inside or outside of the casing such as sensor 32b before the cement process starts, § [0096], not in a rail system.

The applicant argues that Tubel at paragraph [0099] and [0114] to [0116] would appear to suggest that fiber Bragg grating sensors are considered inferior and are not recommended. Specifically, the applicant quotes that Tubel states "reliability can be improved if no sensors 32 are deployed in the rail 302, using reflect photons from the light traveling into fiber optical cable 20 instead" (s§ [0016]). However, MPEP 2121.04 Section II specifically states that "Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). "A known or obvious composition does not become patentable simply because it has

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been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). Hence, although the paragraphs of Tubel disclose that fiber Bragg grating sensors may be inferior to the use of Rayleigh, Brillouin, and Raman scattering does not mean that the art of Tubel teaches away from the use of fiber Bragg gratings. It does not disclose Fiber Bragg gratings as only less desirable or preferable, but not non-functional when concerning measurements.

Applicant also states that "Although Tubel also vaguely states that 'other techniques used to obtain information as the light reflects as it travels in and out of the fiber optical cable 20' ¶ 0115], apparently those skilled in the art would not readily ascertain that fiber Bragg gratings maybe used" (pg 10, ¶ 1). However, Bragg gratings is not a new technology, but rather it is disclosed as "a known sensor" used in optical fibers, Tubel ¶ [0022]. Since it is known to be used in optical system, it would not be unreasonable for the extreme conservative mindset to implement Bragg gratings. Furthermore, these is the express disclosure of the use of discrete sensors 32 to be used within the rail system, ¶ [0115], wherein the definition of discrete according to the Merriam-Webster dictionary is "individual" or "consisting of distinct or unconnected elements". Furthermore, the applicant discloses that the known Bragg Grating sensor is a type of individual sensor places along a fiber length" (¶ [0022]). Hence, it would be obvious to one of ordinary skill in the art to understand that a Bragg grating is a suitable sensor for a discrete sensor disclosed in the railway system.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re*

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*Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, Varasi discloses “the use of optical sensors, made by fiber embedded Bragg grating method and by the use of a planar integrate optics device for the analysis of the optical signals. The sensors may be embedded or bonded to the structure, allowing the measurement of parameters like strain and temperature, in either a static or dynamic regime. The system pertains to the technical field of the diagnostics and measurements of mechanical or thermal parameters and to the application field of ground, water and aerospace transportation”, Abstract. Since it applies ground transportation, it also includes rail road system. Furthermore, it is disclosed that “one result of this invention is to make available a complete compact and integrated system suitable for the real time monitoring service strains on structures and components, with miniature characteristics and compatibility with the environmental conditions in which the structure of component may operate” col. 8, lines 17-22, since Varasi is able to monitor strain and temperature in real time, it does not suffer from delay.

2. The declaration under 37 CFR 1.132 filed 5/4/2011 is insufficient to overcome the rejection of claim 1 based upon *Tubel* applied under 35 U.S.C. 103 as set forth in the last Office action because: the statements of Mr. Lee in combination with the historical development detailed by Professor Ho and verified by Mr. Lee in the declarations, all clearly indicate a prejudice in the field against the introduction of new technology. However, a prejudice in the field does not change the definition of what is obvious or narrow the interpretation of teaching away found in the MPEP and applied under 35 U.S.C. 103. The MPEP 2123 Section II states that “[t]he prior art’s mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or

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otherwise discourage the solution claimed....” In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004) is the definition of teaching away. Hence, teaching an alternative that performs better does not discredit a component that can perform acceptably. This being the case, the Fiber Bragg grating sensors according to Tubel are known and capable of performing in the system, simply because there are better alternatives does not mean that they are not a viable option. In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 4-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tubel (U.S. Patent Application Publication US 2003/0094281 A1) in view of Varasi et al. (U.S. Patent US 5,493,390).

Regarding claims 1 and 16, discloses a railway monitoring system (fig. 5), comprising:  
an optical fiber (fig. 5, fiber 30), wherein a first part of the fiber is attachable to one of a pair of tracks of a rail, and wherein a characteristic of the first part of the fiber is variable in correspondence to variance of a characteristic of said one track where the first part of fiber is attached;

an optical signal emitter (fig. 5, 18a) connected to the fiber for emitting an optical signal into the fiber, wherein the fiber generates at least a first altered optical signal, which contains information relating to the variance of the characteristic of the part of the fiber; and

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an optical signal analyzer (fig. 5, 18b) connected to the fiber for receiving and analyzing the first altered optical signal so as to ascertain the variance of said characteristic of said one track based upon the information contained in the first altered optical signal;

wherein both the emitter and the analyzer are connected to an end of the fiber;

wherein the first altered optical signal is a signal reflected by the fiber towards said end (fig. 5).

Tubel differs from the claimed invention in that Tubel does not specifically disclose that the first part of the fiber includes a first Bragg grating created therein for generating the first reflected optical signal, wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track, and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating. However, Tubel discloses that the fiber sensor can be a Bragg grating (paragraph 0077). Varasi discloses first part of the fiber includes a first Bragg grating (*optical fiber 2 includes Bragg grating sensors 3, Fig. 6*) created therein for generating the first reflected optical signal (*the first fiber sensor is formed within the optical fiber, wherein the sensor providing reflected light substantially at a reflection wavelength, Col 7, lines 39-42*), wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track (*in using the Bragg grating sensor embedded in the structure, mechanical deformation of the structure such as elongation or a contraction cause a variation of the grating pitch and average index of refraction, and consequently a shift in the filter function of the optical grating filter, Col 3, line 65 – Col 4, line 6*), and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating (*the reflection wavelength varying in response to a perturbation of the structure near where the sensor is attached, Col 7, lines 43-45*). Therefore, it would have been obvious for one of



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ordinary skill in the art at the time when the invention, in view of Tubel and Varasi, to incorporate Bragg grating sensors of Varasi, in the system of Tubel because modular sensors to provide in service monitoring of structures and components of railway, Col. 8, lines 30-52).

Regarding claim 4, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose that the first Bragg grating is pre-strained in a direction at least substantially parallel to said one track. However, Examiner takes Official Notice that it is well known in the art to pre-strain a Bragg grating utilized in a sensing device. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate to pre-strain the Bragg grating in the system of Tubel and Varasi in a direction at least substantially parallel to said one track. The motivation would have been to increase the detection sensitivity.

Regarding claim 5, the characteristic of the first Bragg grating in the modified system of Tubel and Varasi relates to a grating period of the first Bragg grating, and wherein the grating period is variable in correspondence to a change in a tensile strain that the first Bragg grating experiences (Varasi: figs. 1-10).

Regarding claim 6, Tubel and Varasi discloses that the first Bragg grating is attached to said one track such that the first Bragg grating experiences a same tensile strain as said one track (note that Tubel and Varasi disclose to bond the sensor to the measured structure, allowing the measurement of parameters like strain).

Regarding claim 7, Varasi discloses that the optical signal analyzer detects a shift in a wavelength of the first reflected optical signal for ascertaining the variance of the characteristic of the first Bragg grating (figs. 1-10).

Regarding claims 8-12, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways of analyzing the

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measured data. However, the cited limitations are only trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 13, Varasi further discloses that the system comprising a second Bragg grating.

Regarding claims 14 and 15, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways of analyzing the measured data. However, the cited limitations only relate to trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 17, Tubel further discloses that the information relates to train or vehicle on said rail (fig. 5).

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANYA NGO whose telephone number is (571)270-7488. The examiner can normally be reached on M - F from 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngo/  
June 28, 2011

/KENNNETH N VANDERPUYE/  
Supervisory Patent Examiner, Art Unit 2613